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An economic study of commercial fruit and vegetable canneries in Louisiana

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INTRODUCTION

An important factor in the financial success of Louisiana farmers is the existence of dependable markets for their products. For fruits and vegetables, canneries have a significant place in the marketing system. Canneries serve to: (1) provide an outlet for fruits and vegetables in areas where no other suitable market is available; (2) prevent heavy losses to growers when the fresh market is temporarily glutted; (3) provide a market for certain low-quality products that are not wanted in the fresh market; (4) stabilize market prices and supplies, thus promoting more orderly marketing.

Purpose of Study

In order to better understand the position of commercial canneries in the marketing of Louisiana fruits and vegetables, and to develop factual information as a basis for appraising the present marketing system and aiding in its constructive development, an economic study of commercial fruit and vegetable canneries was begun in the spring of 1946. An earlier study by the Department of Agricultural Economics of the Louisiana Agricultural Experiment Station, made in 1941, was undertaken primarily to determine the capacity of commercial processing plants in the state and the nature of their operations.[1] The 1941 survey served as a background for the present study. This report presents the findings of the 1946 study and shows changes in the Louisiana fruit and vegetable canning industry during the war years.

Specific objectives of this study were:

1. To determine the number, location, and nature of operations of commercial fruit and vegetable canneries in Louisiana, and the raw products processed by them.

2. To ascertain the quantities of the raw products purchased, prices paid growers, and the costs of the raw products to the canneries of the state.

3. To determine the nature and the extent of the canned fruit and vegetable output, prices received for canned goods, and returns for the pack.

4. To obtain other information regarding operations of the commercial fruit and vegetable canneries of the state; such as, (a) methods of

* Appreciation is expressed for the cooperation and assistance received from the operators of the commercial fruit and vegetable canneries of the state: the officials of can manufacturing companies; and to Dr. B. M. Gile and to Dr. Julian C. Miller of the Louisiana Agricultural Experiment Station, who offered many helpful suggestions.

[1] K. E. Ford and R. A. Ballinger, *Commercial Processing of Fruits and Vegetables in Louisiana,* (Department of Agricultural Economics, Mimeographed Circular Number 27: Baton Rouge, Louisiana; Louisiana Agricultural Experiment Station, June, 1942).

obtaining raw products; (b) methods of distribution of the canned products; (c) installed canning capacity; (d) relations between growers and canners; (e) seasonality of operations; (f) labor requirements; (g) factors related to success and to failure in the canning industry.

Source of Data

Most of the data were obtained by personal interviews with the operators of commercial canneries in Louisiana. Other data were obtained from: (a) officials of can manufacturing companies; (b) reports and publications of the United States Department of Agriculture and the National Canners Association; and (c) reports on similar studies in other states.

This report is limited to those canning plants that purchase raw fruits and vegetables directly from growers and produce dealers. Plants engaged only in reprocessing or in processing by methods other than canning are not included.

FRUIT AND VEGETABLE CANNERIES

Location of Canning Plants

Twenty-two commercial canneries packed fruits and vegetables in Louisiana in 1946. The location of these canneries is shown on the cover page. Some of these did not operate during all of the war years.

The canneries operating in recent years are located in 16 parishes. These canneries are largely concentrated in three sections of the state, but not more than three are in any parish. Two are in the northern section, one having been established in 1945. Nine canneries are in the Bayou Teche section around New Iberia and Lafayette. Two of the new canneries that began operations with the 1946 pack are located in this area. Eight canning plants are located east of the Mississippi River. One of these started operations in 1945, and three in 1946. The three other canneries in the state are located at Harvey, Houma, and Vacherie.

Age of Canning Plants

Eight canneries in the state have been organized more than 15 years (Table 1). Seven have been established from 5 to 14 years. Two canneries started operations in 1945, and five in 1946.

TABLE 1. Age of Commercial Fruit and Vegetable Canneries, Louisiana, 1946

Years of age	Number of canneries
Less than 1 year	5
1 to 5	2
5 to 9	4
10 to 14	3
15 to 19	4
20 or more	4
Total	22

A few canning plants, located mainly in South Louisiana, were originally established to process sea foods. Later fruit and vegetable canning was begun as a supplementary enterprise.

The establishment of seven new canneries during 1945 and 1946 is greater than the usual addition to the canning capacity of the state for a two-year period. This is partly accounted for by the increasing importance of sweet potato production. Six of the new canneries have sweet potato canning as their main enterprise, and are integrated with other operations such as dehydrating and sugarcane syrup manufacturing.

Canning Capacity

The daily capacity of Louisiana canneries was determined by obtaining estimates on each cannery's experience with the 1945 pack of the three major vegetables. Six canneries had the capacity to pack a total of 8,800 cases of okra per day (Table 2).[2] Sixteen thousand cases was the capacity of seven canneries packing snap beans, and 11,200 cases the capacity of eight canneries packing sweet potatoes.

The annual capacity of Louisiana canneries is difficult to determine because some plants pack several products whose seasons overlap. A cannery may be able to pack 800 cases of sweet potatoes or 1,000 cases of mustard greens per day; however, the canning seasons of these two commodities are about the same, so that this cannery could not pack both products at the same time with its present equipment and labor.

TABLE 2. Commercial Canning Capacity for Three Major Vegetables, Louisiana, 1945

Vegetable	Canneries reporting* (Number)	Total daily capacity (Standard cases)
Okra	6	8,800
Snap beans	7	16,000
Sweet potatoes	8	11,200

* Includes only canneries handling these products in 1945.

The supply of raw products during the season is a second factor affecting total capacity. This supply may not be received in a manner that allows the plant smooth and continuous operation. An oversupply may be had at one time and an undersupply at another. If a cannery is to maintain its rated capacity throughout the season for any one product, deliveries must be regular.

Canning Seasons

A cannery should have a reasonably constant supply of raw products throughout the year in order to operate efficiently. Continuous operation

[2] Cans of various sizes and numbers per case are used by commercial canneries. In order to facilitate comparisons in this study, actual cases have been converted to standard cases containing 24 No. 2 cans. Conversion factors from the National Canners Association were used in making calculations. Unless otherwise noted, the term "case" in the remainder of this report refers to standard cases.

permits greater economy in the use of labor and equipment and reduces per unit overhead costs.

The harvesting of sweet potatoes, okra, and snap beans is so timed that canneries are able to plan their operations to have one major commodity to pack during each month of the year. Sweet potatoes are packed in more of the months because of the longer harvesting period and the relative ease of storing until needed for processing. The canning of sweet potatoes in Louisiana begins in July and continues into April (Figure 1). The volume canned during the spring and summer months is relatively small. Few sweet potatoes are harvested for processing in

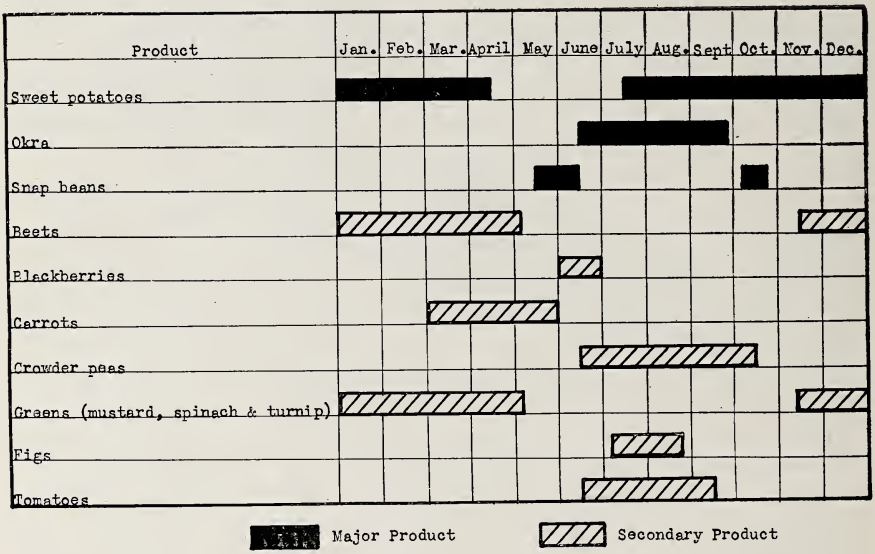

FIGURE 1. Canning Season for Various Fruits and Vegetables, Louisiana, 1945.

July and August, and canning of sweet potatoes is a secondary operation during those months for many canneries. The supply is almost exhausted by April and sweet potato canning is limited, although often it is the major activity at some canneries because the supply of other commodities is low at this season.

Snap bean canning becomes the major operation in May and is usually completed in June. The fall snap bean pack is relatively small because most of the production goes to the fresh market. Just as the spring snap bean pack ends, okra is ready for harvesting and is the major commodity canned during July, August, and early September. Okra becomes secondary to sweet potatoes in September and the pack is rather small that month as compared with sweet potatoes.

The winter greens such as mustard, spinach, and turnip greens are canned at the time sweet potatoes are processed and are secondary to

the sweet potato pack. Canning of winter greens does not interfere to any great extent with the sweet potato pack, and often works in well with sweet potato operations. The winter greens pack is not very large in Louisiana. Beets and carrots are canned about the same months that winter greens are packed.

Blackberries, crowder peas, figs and tomatoes are secondary commodities packed during the summer months by the canneries in the southern part of the state. The canneries in North Louisiana have been exclusively devoted to tomato canning and have operated largely to salvage the surplus tomatoes not taken by the green-wrap market. These canneries process only a small part of the total pack of canned fruits and vegetables in the state.

Cannery Labor

The eight canneries packing sweet potatoes employed 850 part-time workers to handle the 1945 sweet potato pack (Table 3). Six canneries packing okra estimated that a total of 350 part-time employees were used for the okra pack. Seven hundred fifty part-time employees were used by seven canneries during the snap bean season. Maintaining an adequate supply of labor is one of the greatest problems encountered by commercial canneries. The shortage of labor in the entire industrial system during the recent war and the seasonal nature of cannery operations are the reasons for this shortage of cannery workers. Persons

TABLE 3. Number of Part-time Employees in the Commercial Canning of Selected Vegetables, Louisiana, 1945

Vegetable	Canneries reporting	Total part-time employees
Okra	6	350
Snap beans	7	750
Sweet potatoes	8	850

desiring full-time employment can not depend upon the seasonal nature of the labor needs of the canneries. Canneries have two alternatives, either to employ persons desiring only seasonal employment or to maintain a larger labor force than necessary during slack periods. Key or supervisory employees are given full-time employment whenever possible. Other labor necessary only during actual canning operations consists largely of women desiring part-time jobs. Two canneries depend almost entirely upon farm women as a source of labor. In order to obtain labor, several canneries had to provide daily transportation from distances ranging up to 30 miles.

RAW PRODUCTS FOR CANNING

Canning Crop Production Areas

The St. Francisville and Opelousas districts are the areas that furnished almost the entire supply of sweet potatoes needed by Louisiana canneries to pack more than one-half million cases in 1945. One

cannery located within the St. Francisville area and three plants in the southern part of the Opelousas district packed sweet potatoes in 1945. A fifth cannery packing sweet potatoes in 1945 is located a few miles south of the Opelousas district. These five canneries haul the greater part of their sweet potatoes only relatively short distances. The remaining three canneries packing sweet potatoes in 1945 obtained a small part of their sweet potatoes locally, but a larger proportion had to be hauled greater distances than those for the canneries located within the two principal sweet potato growing areas. A few canneries obtain a limited part of their supply from the Oak Grove district in West Carroll Parish.

Snap bean production for commercial canning in Louisiana is largely concentrated in a small area around four canneries in the Teche section. Two of these canneries are in St. Martin Parish and two in Iberia Parish. Canneries in this section obtained snap beans from distances ranging up to 45 miles, although the major part of the supply came from areas nearer the plants. Terrebonne Parish was the main source of snap beans for the canneries at Houma and Harvey. Growers supplying the Houma cannery are within 20 miles of the plant while those supplying the Harvey cannery are as far as 60 miles away. The cannery at Franklinton obtained snap beans grown in Washington Parish, and from Mississippi growers within 40 miles of the plant.

Okra production for commercial canning was confined to almost the same areas as snap beans in 1945, except that one additional cannery in the Teche section packed okra, and the canneries at Houma and Harvey did not pack okra in 1945. The supply of okra for the cannery at Franklinton was grown in Washington Parish, 20 miles or less from the cannery.

Canning Crop Acreage

More than three times as many acres were required to produce the sweet potatoes processed by commercial canneries in Louisiana in 1945 than for all other vegetables combined (Table 4). Sweet potatoes was the only crop showing an increased acreage for canning from 1941 to 1945. Nearly six thousand acres were needed to meet canning requirements in 1945, or almost twice that of 1941. Two canneries specialized in sweet potatoes in 1945, and sweet potatoes was the chief commodity canned in six other plants. Several canneries bought only No. 2 sweet potatoes, which meant that the total production from any specific acre was not delivered to a cannery. A greater acreage is required to produce a given quantity of No. 2 sweet potatoes for canning than if the total production of an acreage is delivered to the canneries.

Of the other four vegetables shown in Table 4, decreases ranging from 50 to 80 per cent of the 1941 acreage were found in the acreage necessary to produce the volume delivered to canneries in 1945. As pointed out above, fewer canneries packed these products in 1945 than in 1941, and the volume was lower because of labor and material shortages, government restrictions, and a favorable fresh market.

The acreage shown in Table 4 is the acreage that would be required to produce the volume delivered to the canneries, and is based upon the average yield per acre obtained in production for the fresh market and the tonnage purchased by canneries. When using this method of determining canning crop acreage it is necessary to assume that the yield per acre is the same in production for the fresh market as for canneries, and

TABLE 4. Acreage Required to Supply Commercial Canneries with Vegetables for Processing, Louisiana, 1941-1945*

Year	Sw't P'toes (acres)	Snap beans (acres)	Tomatoes (acres)	Spinach (acres)	Beets (acres)
1941	3,000	2,400	600	1,200	500
1942	1,000	2,000	300	500	200
1943	800	1,700	200	**	**
1944	2,100	1,000	200	400	100
1945	5,700	1,000	300	300	100

* Acreage calculated by using tonnage purchased by canneries interviewed and 1941-45 average yield obtained in production of vegetables for market. (See text for discussion.)
** Less than 50 acres.

that the same quality of produce is delivered to the canneries as to the fresh market. Neither assumption is correct, and sweet potatoes will be used to illustrate this point.

Canneries often do not buy sweet potatoes on the same grade basis as that used in the fresh market. There is considerable difference in the size requirements for sweet potatoes for the two purposes. The contract used by one cannery specifies that the minimum diameter shall be one and one-third inches but does not specify the maximum size or weight. The United States grade standards for sweet potatoes require that a U. S. No. 2 grade sweet potato must be not less than one and one-half inches in diameter and shall weigh not more than 36 ounces.[3] For higher U. S. grades the minimum diameters are greater and maximum weights are less. Other canneries have size specifications which differ from the one for the above-mentioned cannery and from the U. S. standards for the fresh market. Differences other than size specifications exist for sweet potatoes for the fresh market and for canning.

Deliveries of Raw Products to Commercial Canneries

More than 15,000 tons of the six most important vegetables were purchased by commercial canneries for processing in 1945 (Table 5). This is a slight increase from the 14,000 tons of these vegetables purchased in 1941. The 1944 tonnage was about one-half that of 1941 and less than one-half that of 1945. The smaller deliveries in 1944 than in 1941 and 1945 were due, in part, to the inability of canneries to handle a greater volume for reasons previously discussed, and because of the large volume taken by the fresh market.

[3] *Fruit and Vegetable Regulations,* (Baton Rouge, Louisiana; Louisiana State Market Commission, May 15, 1945), pp. 121-125.

Almost 12,000 tons of sweet potatoes were delivered in 1945, accounting for 76.6 per cent of the total tonnage of vegetables delivered to canneries. Snap beans was the second most important vegetable in deliveries to canneries in 1941, while okra moved to second position in 1945.

Sweet potatoes is the only vegetable that did not decrease in tonnage in 1945 compared with 1941. On the contrary, sweet potatoes pur-

TABLE 5. Quantity of Vegetables Purchased for Processing by Commercial Canneries, Louisiana, 1941, 1944, and 1945

Vegetable	Quantity purchased						Per cent change 1941 to 1945
	Thousand tons			Per cent of total			
	1941	1944	1945	1941	1944	1945	
Sweet potatoes	6.2	4.4	11.8	43.4	60.3	76.6	90.3
Okra	2.3	1.0	1.4	16.0	13.7	9.2	-39.1
Snap beans	2.4	1.0	1.0	16.8	13.7	6.5	-58.3
Tomatoes	1.1	.3	.5	7.7	4.1	3.2	-54.5
Beets	1.4	.3	.4	9.8	4.1	2.6	-71.4
Spinach	.9	.3	.3	6.3	4.1	1.9	-66.7
TOTAL	14.3	7.3	15.4	100.0	100.0	100.0	7.7

chased by canneries nearby doubled and more than offset declines in other products. Decreases for other vegetables ranged from 39.1 per cent for okra to 71.4 per cent for beets.

Raw Product Prices

The average cannery price for sweet potatoes increased from $13 per ton in 1941 to $44 in 1945, a gain of 238.5 per cent (Table 6). Snap beans increased 105 per cent, from $40 to $82 per ton.

The prices which Louisiana canneries paid for raw products were less than the average prices growers received on the fresh market (Table 7). The cannery price for sweet potatoes averaged $1.21 per bushel in 1945, compared with $1.50 on the fresh market. For most vegetables the spread was relatively greater.

Cannery prices for sweet potatoes advanced from $0.36 per bushel in 1941 to $1.21 per bushel in 1945. This was a greater relative increase than that of sweet potatoes in the fresh market, which advanced from $0.72 to $1.50 during the same period. The cannery price in 1941 was 50 per cent of the fresh market price, while in 1945 it was 80 per cent of the fresh market price. This indicates that either the sweet potatoes for canning in 1945 more nearly approached the quality of those for the fresh market or that the demand for sweet potatoes for canning had increased. Prices of snap beans for canning also showed a slight increase in relation to prices in the fresh market.

Cannery prices are not strictly comparable to fresh market prices because the two products are not exactly comparable and are handled differently. It has been noted in a previous section that there is usually a difference in the specifications for a product going to a cannery and

for a product for the fresh market. A second factor is the greater expense incurred in preparing a commodity for the fresh market. Vegetables for canning need only be reasonably clean and little or no packaging is required because sales are generally in bulk by weight. Less preparation and packaging represents considerable savings to growers and permits the sale of their products to canneries at lower prices.

TABLE 6. Changes in Prices Paid for Vegetables by Commercial Canneries, Louisiana, 1941, 1944, and 1945

Vegetable	Dollars per ton			Per cent change
	1941	1944	1945	1941 to 1945
Sweet potatoes	13	42	44	238.5
Tomatoes	13	33	28	115.4
Snap beans	40	80	82	105.0
Beets	17	28	28	64.7
Okra	21	28	30	42.9
Spinach	26	33	35	34.6

TABLE 7. Prices of Vegetables for Fresh Market and for Commercial Canning, Louisiana, 1941, 1944, and 1945

Vegetable and use	Dollars per bushel		
	1941	1944	1945
Sweet potatoes			
For market*	0.72	1.45	1.50
For canning	0.36	1.15	1.21
Snap beans			
For market*	1.32	2.30	2.57
For canning	0.58	1.20	1.23
Beets			
For market*	0.50	1.14	1.16
For canning	0.44	0.73	0.73
Tomatoes			
For market*	1.15	3.25	3.75
For canning	0.34	0.87	0.74
Spinach			
For market*	0.60	1.06	1.15
For canning	0.23	0.30	0.32

* *Agricultural Statistics,* (Washington, D. C.: United States Department of Agriculture.)

Another factor to be considered when comparing fresh market prices and cannery prices is that fresh market prices are subject to wide fluctuations within short periods of time while cannery prices are relatively stable through the canning season. The fresh market price most often used in comparisons is an average price, which may conceal a very high price at one time and a price so low at other times that it does not cover

the cost of harvesting the product and packaging it for shipment. Spring snap beans were $1.25 per bushel in 1941, and early fall beans $1.65 per bushel.[4] The annual "average price" computed for that year by using the prices for the two seasons and weighing them by production was $1.32 per bushel. By reporting only the annual average price, the high price of snap beans in the fall season is not clearly shown. Daily price fluctuations in the fresh market are even greater than seasonal changes.

It is seldom possible for canneries to obtain sufficient volume when wide margins exist between fresh market and cannery prices. One author concludes: "While canneries cannot meet the fresh-market price when it is high, they offer a much better outlet for vegetables and fruits when there is a glut on the fresh market. If the cannery price more than covers the cost of harvesting and hauling the products to the cannery, it is much better to sell them to the packing plants than to let them rot in the fields."[5] This would not be possible unless there were canneries available to handle the produce when the fresh market was an unfavorable outlet. Few canneries can operate efficiently on fresh market surpluses alone. They must be able to obtain enough volume throughout the season to permit reasonably full operation. Normally, canning plants do not operate at full capacity, so that temporary fresh market surpluses can be handled. Stepp has developed a program recommended for South Carolina in which the growers send to the canneries a quantity of products that would give the canneries from 25 to 35 per cent of their full capacity regardless of the fresh market prices; and when fresh market prices are equal to or below minimum prices previously agreed upon by the canneries, the farmers would deliver all of their production to the canneries.[6] This plan may offer one solution to the problem faced by many Louisiana canneries in obtaining sufficient and steady deliveries. In delivering a fixed proportion of his production to the cannery regardless of the fresh market price, the grower would be assured an outlet at a guaranteed minimum price for his production at times when the fresh market price is low. The gross returns to the growers probably would be more stable under a program of this nature. The cannery would be assured a supply of raw products throughout the season at a price determined even in advance of planting.

Canning Crop Value

Approximately $670,000 were expended by Louisiana canneries to obtain the six most important raw products they processed in 1945 (Table 8). The increase in expenditures was 133.4 per cent over those for

[4] J. P. Montgomery, *Production, Price, and Value of Selected Crops, Livestock and Livestock Products in Louisiana, 1910-1944,* (Department of Agricultural Economics, Mimeographed Circular No. 49; Baton Rouge, Louisiana: Louisiana Agricultural Experiment Station, Dec. 1945), pp. 32-33.

[5] J. A. Stepp, *An Economic Study of Commercial Fruits and Vegetable Canneries in South Carolina,* (Bulletin 342; Clemson, South Carolina: South Carolina Agricultural Experiment Station, Sept. 1942), p. 28.

[6] *Ibid.,* p. 29.

1941, which amounted to $287,000. Expenditures by canneries for fruits and vegetables have been used in this section rather than the amount paid to farmers because in certain instances canneries do not buy directly from farmers. A considerable volume of sweet potatoes is bought from storage plants. Practically the entire supply of the other commodities is purchased directly from farmers.

TABLE 8. Expenditures for Vegetables for Processing by Commercial Canneries, Louisiana, 1941, 1944, and 1945

Vegetable	Total expenditures						Per cent change
	Thousand dollars			Per cent of total			
	1941	1944	1945	1941	1944	1945	1941 to 1945
Sweet potatoes	82	186	516	28.6	58.1	77.1	529.3
Snap beans	95	78	80	33.1	24.4	11.9	-15.8
Okra	48	28	42	16.7	8.8	6.3	-12.5
Beets	24	7	10	8.4	2.2	1.5	-58.3
Tomatoes	15	11	13	5.2	3.4	1.9	-13.3
Spinach	23	10	9	8.0	3.1	1.3	-60.9
TOTAL	287	320	670	100.0	100.0	100.0	133.4

Because of higher prices paid and a greater volume, expenditures for sweet potatoes increased from $82,000 in 1941 to $516,000 in 1945, an increase of more than 500 per cent. The percentage decrease in expenditures for other vegetables in 1945 over 1941 ranged from about 12 per cent for okra to about 60 per cent for spinach. The decreases were caused by the reduced volume of these products.

Sweet potatoes accounted for 77.1 per cent of the total expenditures in 1945. Expenditures for other products ranged from about one per cent of the total for spinach to 12 per cent for snap beans. Sweet potatoes occupied a relatively lower position in total costs in 1941 than did snap beans, but were seven times as important in 1945.

Purchasing Methods

Louisiana canneries obtain raw fruits and vegetables by purchasing them in the open market and by means of canner-grower contracts. In 1945, five canneries purchased their entire supply of sweet potatoes in the open market; one cannery bought only from contract growers; and two canneries used both methods (Table 9).[7] Sweet potato purchases in the open market were made by plant representatives from growers and storage sheds.

Canner-grower contracts were used by five canneries in purchasing snap beans, and by four canneries in purchasing okra in 1945. One cannery purchased snap beans in the open market directly from growers,

[7] The term "open market" as used in this study includes all buying and selling activities except those between canneries and the growers with whom they have contracts. Sales made under contracts may be referred to as "closed market" deals.

and one used both methods. The open market was the source of supply of okra for one cannery, while another purchased from both contract and non-contract growers. Two canneries processed dry beans and dry peas grown in other states and obtained them through commission agents. A part of the supply of beets of two canneries was purchased through commission agents from Texas.

TABLE 9. Methods Used by Commercial Canneries to Obtain Raw Products, Louisiana, 1945

Product	Number of canneries using			Total
	Open market	Grower contracts	Both methods	
Sweet potatoes	5	1	2	8
Snap beans	1	5	1	7
Okra	1	4	1	6
Beets	1	0	2	3
Spinach	0	1	2	3
Tomatoes	0	1	2	3

Canner-Grower Relations

It is to the advantage of cannery operators to maintain constant contact with the growers either directly or through field men employed by the cannery. However, few canneries employ field men whose main job is to promote a close working relationship between growers and the cannery management. Lack of sufficient volume, failure to recognize the importance of close contact with growers, and the inability to employ well-trained field men often account for this situation. In small canneries the plant manager usually performs the functions of a field man in addition to his other duties.

Duties of a field man employed by a cannery include aiding growers in selecting soils, fertilizers, varieties of crops to be planted, and time of planting. Planting dates are important because of the later effect on deliveries to the cannery. The field man usually handles the distribution of seeds and materials furnished by the cannery and advises growers as to production methods and time of harvesting. Contracts between the cannery and growers are promoted and supervised by the field man, thereby insuring the cannery of deliveries according to the contractual agreement.

The practice of furnishing seed and fertilizer on account to growers has been largely discontinued by Louisiana canneries. The failure of growers to deliver their entire crops to the canneries appears to be the cause for the discontinuance of this practice. Growers have often contracted a specified acreage, accepted seed and fertilizer on account, and then failed to deliver a part or all of their production to the cannery. Canneries have no practical means of forcing collections. Several canneries have lost money in the past because of their inability to collect such accounts. This has been especially true when the fresh market has

offered a higher price than the canneries agreed to pay. The general practice in recent years has been for canneries to sell seeds and fertilizer on a cash basis at cost.

Canneries have controlled varieties largely by selling to the growers seeds of varieties they desired to process. This has enabled canneries obtaining most of their supply from contract growers to have one-variety packs. It is most difficult to control variety when purchasing raw products in the open market. Under such conditions the only variety control canneries have is to refuse to purchase produce not of the desired variety.

Quality is controlled by canneries through the use of contracts which state the specifications for produce they will accept. In open market purchases quality is controlled by refusal to purchase produce that does not meet the desired specifications. Canneries have been rather tolerant in their quality specifications in recent years. Instances were found where produce was accepted well below standard in order to secure sufficient volume and to maintain good relations with growers. It is expected that contractual requirements regarding quality will be more rigidly enforced when supplies for processing become available in greater volume.

THE FINISHED PACK

Commercial fruit and vegetable canneries in Louisiana packed 911,000 cases of fruits and vegetables in 1945 (Table 10). This was the largest pack of any war year, and nearly twice the 1944 output, but 19.4 per cent less than the production in 1941. The pack each year from 1942 through 1944 amounted to about one-half the 1941 pack, with the greatest reduction in 1943.

The sweet potato pack of 551 thousand cases amounted to almost two-thirds of the total fruit and vegetable pack in 1945, as compared

TABLE 10. Quantity of Vegetables Packed by Commercial Canneries, Louisiana, 1941-1945

Vegetable	Quantity packed										Per cent change
	Thousand cases					Per cent of total					
	1941	1942	1943	1944	1945	1941	1942	1943	1944	1945	1941 to 1945
Sweet potatoes	300	103	102	194	551	26.5	19.8	23.4	38.6	60.5	83.7
Snap beans	224	192	164	91	95	19.8	37.0	37.8	18.2	10.0	-57.6
Okra	179	67	76	93	114	15.8	12.9	17.5	18.5	12.5	-36.3
Spinach	83	52	17	22	18	7.4	10.1	3.9	4.4	2.0	-78.3
Beets	69	33	5	18	26	6.2	6.4	1.1	3.6	2.9	-62.3
Tomatoes	44	21	14	12	17	3.9	4.0	3.2	2.4	2.0	-61.4
All others*	231	51	57	72	90	20.4	9.8	13.1	14.3	10.1	-61.0
TOTAL	1,130	519	435	502	911	100.0	100.0	100.0	100.0	100.0	-19.4

* Includes corn, figs, dry peas, fresh field peas, mustard greens, and minor crops which were packed occasionally.

with less than one-third of the total for 1941. Sweet potatoes ranked second to snap beans in 1942 and 1943, but were twice as important as snap beans in 1944, and six times as important in 1945. Two factors responsible for the change in the relative position of sweet potatoes in 1942 and 1943 were the government regulations and restrictions in the uses of tinplate and sugar, and wartime demand for dehydrated sweet potatoes. These same factors also affected the 1944 pack but not to the extent as in 1942 and 1943.

The syrup pack and the solid pack are the two methods of sweet potato canning most extensively used by canneries in Louisiana. The syrup pack has ranged from almost 80 to more than 90 per cent of the sweet potato pack from 1942 through 1945. Demand for this pack, which is ready to serve when removed from the can, appears to be increasing, both actually and relatively to the solid pack. Solid-pack sweet potatoes are largely desired for pastries and similar uses in which additional cooking is necessary.

Second in importance in 1941 was the snap bean pack of 224,000 cases, comprising one-fifth of the total fruit and vegetable pack in Louisiana. Snap beans became the most important product in 1942 and 1943. This resulted because of a greatly reduced sweet potato pack. In 1944 and 1945 snap beans ranked third in volume, exceeded by sweet potatoes and okra.

Yield of Finished Product Per Ton of Raw Material Purchased

There is considerable variation among commodities in the number of cases of finished goods obtained from a ton of raw product. The seven canneries packing snap beans in 1945 obtained 97 cases per ton of snap beans purchased (Table 11). High yields are also common for okra, spinach, and beets. Sweet potatoes and tomatoes have a much lower turnout per ton of raw product processed.

Differences in cannery yield among products are due mainly to differences in losses in preparation and in the ratio of weight to volume. For example, 73 cases of okra were obtained per ton, although losses from trimmings and overly matured pods amounted to 35 per cent of

TABLE 11. Standard Cases Obtained Per Ton of Vegetables Purchased by Commercial Canneries, Louisiana, 1941, 1944, and 1945

Vegetable	Standard cases per ton		
	1941	1944	1945
Snap beans	92	94	97
Okra	79	90	82
Spinach	80	74	73
Beets	48	69	68
Sweet potatoes	48	44	47
Tomatoes	39	35	35

the quantity purchased (Table 12). On the other hand, the losses on sweet potatoes were slightly less than okra, but only 47 cases were obtained per ton. Okra is light in weight relative to its volume, so that the 1,300 pounds of usable product per ton filled a larger number of cans. Sweet potatoes have a relatively low ratio of volume to weight and losses in preparation are large, especially for syrup-packed sweet potatoes.

TABLE 12. Raw Material Losses in Commercial Canning of Vegetables, Louisiana, 1946

Vegetable	Losses per ton purchased	
	(pounds)	(per cent)
Okra	700	35
Sweet potatoes	660	33
Beets	330	17
Snap beans	100	5
Spinach	100	5

Yield of finished goods per ton of raw product varies from one season to another because of differences in the quality of raw products processed. Differences in quality may result from favorable or unfavorable farm production conditions, or from variations in the tolerances of cannery buyers. When supplies of raw products for processing are small because of crop failure or high fresh market prices, products of lower quality are frequently handled by canneries.

Yield per ton also varies among canneries because of differences in type or variety of raw materials processed, the method of canning used, and the efficiency of the individual plants.

Canned Vegetable Prices

Prices received by Louisiana canneries for finished products in 1945 were much higher than in 1941 (Table 13). Increases ranged from 22 per cent for tomatoes to 80 per cent for sweet potatoes. Four of the six major products were up in price in 1945 compared with 1944.

Prices for syrup-packed sweet potatoes have been higher than for the solid-packed type. The average difference in price per case amounted to twenty-one cents in 1941, five cents in 1944, and sixty-five cents in 1945. Syrup-packed sweet potatoes increased from $1.78 per case in 1941 to $3.15 in 1945, a change of 77.0 per cent. Solid-pack prices increased from $1.57 to $2.50, or 59.2 per cent.

Cannery prices for snap beans increased from $1.58 per case in 1941 to $2.44 in 1945, or 54.4 per cent. Most of the increase occurred prior to 1944. Whole-bean prices increased more than cut-bean prices. Canned whole beans are normally higher in price than cut beans, the difference amounting to $0.63 per case in 1945. Costs are usually greater in packing whole beans because a higher quality product is desired and more labor is required in processing.

TABLE 13. Prices Received for Vegetables Packed by Commercial Canneries, Louisiana, 1941, 1944, and 1945

Vegetable	Dollars per standard case			Per cent change 1941 to 1945
	1941	1944	1945	
Sweet potatoes*	1.68	2.81	3.03	80.4
Syrup pack	1.78	2.82	3.15	77.0
Solid pack	1.57	2.77	2.50	59.2
Snap beans*	1.58	2.33	2.44	54.4
Cut beans	1.57	2.21	2.25	43.3
Whole beans	1.82	2.90	2.88	58.2
Okra*	1.60	1.87	1.97	23.1
Cut okra	1.59	1.86	1.97	23.9
Whole okra	1.79	2.43	2.10	17.3
Beets	1.52	2.11	2.12	39.5
Spinach	1.59	2.18	2.11	32.7
Tomatoes	1.64	2.16	2.00	22.0

* Weighted by volume of each type pack sold.

The 1945 price of cut okra averaged $1.97 per case, or almost 24 per cent higher than the 1941 price of $1.59. Whole-okra prices have been higher than prices of cut okra, but the pack of whole okra has been negligible.

Cannery Price Margins

Changes in prices received by canneries for finished goods and changes in prices paid for raw fruits and vegetables from 1941 to 1945 have resulted in wide variations in the margins between prices paid and received (Table 14). Dollar margins increased for all commodities except tomatoes. The dollar margins for sweet potatoes increased from $1.41 per case in 1941 to $2.09 in 1945. Thirty-one per cent of the finished goods price of sweet potatoes was required to pay for the raw product in 1945, as compared with 16.1 per cent in 1941. The raw material cost was $0.27 per standard case in 1941 and $0.94 in 1945, as compared with cannery selling prices of $1.68 and $3.03, respectively.

Both dollar margins and relative margins are important to growers and canners. In general, the ratios of prices received for finished goods to prices paid for raw products by canners decreased from 1941 to 1945, that is, a greater proportion of the price received by canners for canned vegetables was spent for raw products in 1945 than in 1941. Beets showed the only decline; in 1945 the raw material price was 16 per cent of the finished product price as compared to 23 per cent in 1941.

TABLE 14. Relationship of Prices Received for Finished Products to Prices Paid for Raw Vegetables, Louisiana Commercial Canneries, 1941, 1944, and 1945

Vegetable and item	Unit	(Standard case basis)		
		1941	1944	1945
Sweet potatoes				
Price cannery received	$	1.68	2.81	3.03
Raw material cost	$	0.27	0.96	0.94
Cannery margin	$	1.41	1.85	2.09
Part of cannery price to pay for raw material	%	16.1	34.2	31.0
Snap beans				
Price cannery received	$	1.58	2.33	2.44
Raw material cost	$	0.42	0.85	0.85
Cannery margin	$	1.16	1.48	1.59
Part of cannery price to pay for raw material	%	26.6	36.5	34.8
Okra				
Price cannery received	$	1.60	1.87	1.97
Raw material cost	$	0.26	0.30	0.37
Cannery margin	$	1.34	1.57	1.60
Part of cannery price to pay for raw material	%	16.3	16.0	18.8
Spinach				
Price cannery received	$	1.59	2.18	2.11
Raw material cost	$	0.28	0.44	0.48
Cannery margin	$	1.31	1.74	1.63
Part of cannery price to pay for raw material	%	17.6	20.2	22.7
Beets				
Price cannery received	$	1.52	2.11	2.12
Raw material cost	$	0.35	0.32	0.34
Cannery margin	$	1.17	1.79	1.78
Part of cannery price to pay for raw material	%	23.0	15.2	16.0
Tomatoes				
Price cannery received	$	1.64	2.16	2.00
Raw material cost	$	0.34	0.96	0.79
Cannery margin	$	1.30	1.20	1.21
Part of cannery price to pay for raw material	%	20.7	44.4	39.5

The item in Table 14 labeled "Part of cannery price to pay for raw material" could have been correctly labeled "Farmers' share" for several commodities. The "raw material cost" item was often the price that canneries paid directly to growers for vegetables delivered either to the canneries or to receiving sheds operated by canneries. The raw materials cost for sweet potatoes, and in some instances for other vegetables, was not the price that the grower received because canneries did not obtain all their supply from them.

The raw material costs for snap beans and okra more nearly represent prices paid directly to the growers. More snap beans, okra, and spinach were purchased directly from growers than any other vegetable. Some of the beet purchases were made through commission agents. Tomatoes, too ripe for shipment to the fresh market, are sometimes sold to canneries. Some of the plants have sent their trucks to the packing sheds to obtain tomatoes, so not all purchases were made directly from farmers. However, this practice was not followed in 1945.

Returns from Finished Product Sales

Gross returns from the sale of canned fruits and vegetables by commercial canneries in Louisiana amounted to $2,437,000 in 1945 (Table 15). This was an increase of 33.7 per cent over gross returns of $1,823,000 in 1941. The increase resulted from the sharp rise in returns for canned sweet potatoes, since the pack of all other commodities decreased in value.

Sales of canned sweet potatoes amounted to $1,668,000, or more than two-thirds of the gross receipts of canneries in 1945. Snap beans and okra returns, next in importance, were about one-eighth as great.

TABLE 15. Returns from Fruits and Vegetables Packed by Commercial Canneries, Louisiana, 1941, 1944, and 1945

Vegetable	Gross Returns						Per cent change
	Thousand dollars			Per cent of total			
	1941	1944	1945	1941	1944	1945	1941 to 1945
Sweet potatoes	504	546	1,668	27.7	45.1	68.4	231.0
Snap beans	355	212	232	19.5	17.5	9.5	-34.6
Okra	287	174	225	15.7	14.4	9.2	-21.6
Spinach	132	48	38	7.1	4.0	1.6	-71.2
Beets	105	38	55	5.8	3.1	2.3	-47.6
Tomatoes	72	26	34	3.9	2.1	1.4	-53.0
All others*	368	167	185	20.2	13.8	7.6	-49.7
TOTAL	1,823	1,211	2,437	100.0	100.0	100.0	33.7

* Includes corn, figs, dry peas, fresh field peas, mustard greens, and other minor crops which were packed occasionally.

Market Outlets and Sales Policy

The principal marketing channel for Louisiana canneries is through brokers. Nearly all canneries used this outlet in 1945. One cannery sells its entire pack, which was rather limited in size and consisted of only one commodity in 1945, to a wholesale firm.

According to cannery officials, the broker seems to provide a satisfactory sales outlet. Few canneries market their production throughout the year, and an attempt by them to maintain constant contact with the market would probably be more expensive than the brokerage now charged. This fee amounted to three per cent in 1945, except for one cannery which paid five per cent to a broker who provided additional services.

Most sales of finished goods are made during and after the processing season for a commodity. Several canneries do forward selling through their brokers, subject to crop conditions. Some accept orders in advance of the normal planting season of vegetables to be processed.

Brokers handle practically all of the sales promotion done on fruits and vegetables packed by Louisiana canneries, except for the advertising accomplished through cannery labels. About 75 per cent of the total pack in this state was sold under the canneries' own labels. The remaining 25 per cent was sold with the buyer's labels put on by the canneries. A few canneries sold their entire output under their own labels.

The destinations of finished products shipped by the commercial canneries of the state vary widely. Several small canneries ship their packs exclusively intra-state. Their limited operations, both in size of pack and number of commodities handled, does not justify their meeting the requirements necessary to move the pack in interstate commerce.

Canneries with larger packs and a greater variety of products have a much wider area of distribution. Some concentrate sales effort in definite areas. The principal areas of distribution outside of Louisiana are on the Pacfic Coast and in the Middle West.

SUMMARY, CONCLUSIONS AND OUTLOOK

Commercial canneries are important to many fruit and vegetable growers in Louisiana because they serve as a market for local produce and are a stabilizing influence in the marketing system.

Twenty-two commercial fruit and vegetable canneries operated in the state in 1946. Seven of these were established during 1945 and 1946.

Restrictions on the use of tinplate and other materials, scarcity of labor, and relatively high prices for fresh produce caused Louisiana canneries to reduce the size of their pack during the war. Production in 1945 amounted to 911,000 cases compared with 1,130,000 cases in 1941. The packs in 1942, 1943, and 1944 were less than one-half of the 1941 production.

One of the most important developments in the canning industry of the state during recent years has been the great increase in the production of canned sweet potatoes. This pack increased from 300,000 cases in 1941 to 551,000 cases in 1945, a gain of 83.7 per cent. Sweet potatoes made up 60.5 per cent of the total canned fruit and vegetable pack in 1945. Seventeen canneries are expected to pack sweet potatoes during the 1946-47 season, and the production will likely exceed that of 1945.

Okra and snap beans were the other leading vegetables canned in 1945. Beets, spinach, tomatoes, and winter greens accounted for most of the remainder. Fruits, mainly figs, are a negligible part of the total pack of canneries.

Louisiana canneries have the equipment to handle a much greater volume of all raw products than they have processed in the past. Seven

canneries had a capacity of 16,000 cases of snap beans per day in 1945, but packed only 95,000 cases during the entire season. This amounted to only six day's production at full capacity, although the snap bean canning season starts in May and ends in June, a period of about 40 days.

Prices paid by canneries for fruits and vegetables for processing increased considerably from 1941 to 1945. Sweet potato prices increased from $13 per ton in 1941 to $44 in 1945, a gain of 238.5 per cent. Price increases for other vegetables ranged from 24.6 per cent for spinach to 115.4 per cent for tomatoes.

Total expenditures for the six most important vegetables purchased by canneries amounted to $670,000 in 1945, an increase of 133.4 per cent over the $287,000 expended in 1941. The greatest increase in expenditures was for sweet potatoes, a change from $82,000 in 1941 to $516,000 in 1945.

Increases in prices received by canneries for finished goods in 1945 over 1941 ranged from 22 per cent for tomatoes to 80.4 per cent for sweet potatoes.

Dollar margins between prices paid and prices received by canneries increased from 1941 to 1945 on all products except tomatoes. However, since raw product prices increased relatively more than canned goods prices, a greater proportion of the finished goods price was required to purchase the raw product in 1945.

The total returns to canneries for the finished pack was $2,437,000 in 1945, or 33.7 per cent higher than the 1941 returns of $1,823,000. However, all individual packs decreased in total returns during this period except sweet potatoes. The returns for canned sweet potatoes amounted to $1,668,000 in 1945. This was an increase of 231.0 per cent of the 1941 returns of $504,000.

Canneries obtain most of their products from nearby growers either delivered to the plants or at country receiving points and storages. About half of the tonnage of sweet potatoes processed is secured from storage houses located in the sweet potato growing districts.

Only a few canneries employ full-time field men to maintain contact with growers and to supervise the field operations of the canning plants. Some plant operators feel that their businesses are too small to justify employing a full-time field representative, and others report the scarcity of trained personnel.

Canneries usually market their finished products through food brokers. The major part of the pack is identified by canneries' labels, although buyer's labels are used to some extent.

In order for the fruit and vegetable canning industry of Louisiana to enjoy greater prosperity and to become a more stable and profitable market for locally-grown produce, several rather serious handicaps need to be overcome. One important problem is the very short and interrupted canning season resulting from the inability of canneries to obtain a con-

tinuous supply and sufficient volume of raw products. Canneries are attempting to meet this problem in several ways: (1) by increasing the variety of fruits and vegetables handled, such as adding sweet potatoes; (2) processing products other than fruits and vegetables, such as sea foods and sugar-cane syrup; (3) combining canning with other processing enterprises, such as quick-freezing and dehydrating; (4) encouraging a larger acreage of truck crops locally; (5) drawing raw products from a wider area; (6) growing a portion of their own raw products.

A second problem of canneries is that of maintaining a full, well-trained labor force. This problem would become less acute with a larger volume of processing during a longer season. Canneries would benefit through lower labor recruiting and transportation costs and by the greater efficiency of better-trained employees.

A third problem of cannery officials in Louisiana, and elsewhere, is the failure of growers to abide by the provisions of grower-canner contracts, especially the failure to make deliveries to canneries when fresh market prices exceed contract prices. On the other hand, when fresh market prices are relatively low, growers frequently are dissatisfied with the grading and receiving practices of canners. This problem can be partially solved by improved contractual agreements and by better canner-grower relations in general. A program has been developed in South Carolina whereby growers agree to deliver a specified portion of their production to the cannery at a predetermined price. The cannery agrees to accept the entire crop at this price, provided it equals or exceeds the fresh market price. If the fresh market is more favorable, growers are free to sell the uncontracted part of their crop wherever they choose. This assures the cannery of a minimum supply of produce and guarantees the growers a minimum price for their entire crop. Under such a plan, it is almost necessary that the cannery have a full-time field man to supervise the delivery of produce. A field man can do much to improve contractual relations, to the benefit of both canneries and growers.

Yield per acre for most canning crops is low in Louisiana compared with the yield in the more important production areas of other states. Much research and experimental work has been done by horticultural workers in order to develop varieties of crops that yield well in Louisiana and provide produce of the quality and type suitable for canning. Those products in which Louisiana has a comparative advantage at present probably should receive major emphasis in programs for the improving of varieties, processing methods, and consumer demand. Included in this category are sweet potatoes, okra, snap beans, figs, peppers, and sugar-cane syrup.

To solve these problems will require the best efforts of cannery officials, farm leaders, and agricultural extension and experiment station workers.